

Easy MCQs, Hard MCQs, and long Questions with Answers: Collision number, Collision Frequency, Collision Diameter, Mean Free Path, and Mean Free Time

☰ Content Type	Questions and Answers
☼ Status	Done
☰ Chapter	Gaseous State
☰ Course	Graduation
☰ Reference	
☰ Subject	Physical Chemistry
☰ Topic	Collision Collision Diameter Collision frequency Collision number Diameter Frequency Mean free Path Mean free time
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# Progress (%)	100
☰ Difficulty Level	Medium
☰ Mistake type	

MCQs : Easy



Prh looo....



What is the relationship between collision frequency and molecular weight?

- A) Directly proportional
- B) Inversely proportional
- C) No relationship

Answer: B) Inversely proportional



What is the mean free path?

- A) The average distance traveled by a particle between collisions
- B) The average time elapsed between collisions of a particle in a system
- C) The total number of collisions that occur between particles in a system

Answer: A) The average distance traveled by a particle between collisions



What is the collision diameter?

- A) The effective size of a particle for the purpose of collisions
- B) The number of collisions that occur between particles in a system per unit time
- C) The total number of collisions that occur between particles in a system

Answer: A) The effective size of a particle for the purpose of collisions



What is the mean free time?

- A) The average distance traveled by a particle between collisions
- B) The average time elapsed between collisions of a particle in a system
- C) The total number of collisions that occur between particles in a system

Answer: B) The average time elapsed between collisions of a particle in a system



What is the collision number?

- A) The effective size of a particle for the purpose of collisions
- B) The number of collisions that occur between particles in a system per unit time
- C) The total number of collisions that occur between particles in a system

Answer: C) The total number of collisions that occur between particles in a system



What is the relationship between the mean free path and the number density of particles in a system?

- A) Directly proportional
- B) Inversely proportional
- C) No relationship

Answer: B) Inversely proportional



What is the relationship between the mean free time and velocity of particles?

- A) Directly proportional
- B) Inversely proportional
- C) No relationship

Answer: B) Inversely proportional



What is the purpose of the collision diameter in particle interactions?

- A) To determine the outcome of collisions such as chemical reactions, phase transitions, and material properties
- B) To measure the average distance traveled by a particle between collisions
- C) To measure the average time elapsed between collisions of a particle in a system

Answer: A) To determine the outcome of collisions such as chemical reactions, phase transitions, and material properties



What is the role of collision frequency in studying the behavior of gases, liquids, and solids?

- A) To calculate the rate constants for chemical reactions
- B) To measure the number density of particles in a system
- C) Both A and B

Answer: C) Both A and B



Can the collision number be used to study the behavior of gases, liquids, and solids?

- A) Yes
- B) No

Answer: A) Yes

MCQs: Hard



What is the importance of collision frequency in understanding the thermodynamics of a system?

- A) It helps to determine the rate of heat transfer
- B) It helps to calculate the rate of energy exchange between particles
- C) Both A and B

Answer: C) Both A and B



Can the mean free path be used to calculate the diffusion coefficient of a substance in a system?

A) Yes

B) No

Answer: A) Yes



What is the relationship between the collision diameter and the cross-section area of a particle in a system?

A) Directly proportional

B) Inversely proportional

C) No relationship

Answer: A) Directly proportional



How is the collision frequency related to the rate constant of a chemical reaction in a system?

A) Directly proportional

B) Inversely proportional

C) No relationship

Answer: A) Directly proportional



Can the mean free time be used to calculate the viscosity of a fluid?

A) Yes

B) No

Answer: B) No

Long Q&A



Explain the relationship between collision frequency and the rate constant of a chemical reaction.

Answer: The collision frequency is related to the rate constant of a chemical reaction because it represents the number of collisions between particles per unit time. A chemical reaction occurs when two or more particles collide and react to form new substances. The rate constant of a chemical reaction is a measure of the rate at which the reaction occurs, and it depends on the number of collisions between reactant particles. The collision frequency provides information on the number of collisions between particles in a system and thus provides information on the likelihood of a chemical reaction occurring. If the collision frequency is high, the number of collisions between particles is increased, leading to an increased likelihood of reaction and a higher rate constant. On the other hand, if the collision frequency is low, the number of collisions between particles is decreased, leading to a decreased likelihood of reaction and a lower rate constant. As such, the collision frequency is directly proportional to the rate constant of a chemical reaction.